



Charlotte Mason's House of Education,
Scale How, Ambleside, UK, 2009

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multiplication table is a good exercise, for it is necessary to have it at the tip of the tongue. A very favourite exercise and one requiring a good deal of steady concentration is what we call *unpicking*—

Think of $20 \div 4, \times 3, \div 5, \times 6, \div 2, \div 3$. Answer, 3.

What had you before 3, 9; before 9, 18; before 18, 3; before 3, 15; before 15, 5; before 5, 20. When this is easy leave out "before"—

Think of $\frac{1}{4}$ of 12, $-\frac{1}{4}$ of 8, $+\frac{1}{4}$ of 16, $+\frac{1}{4}$ of 20 = 10.

Now unpick, 10, 5, 1, 3.

With a class of children it is very stimulating. To let each member join in giving part of a question, which shall be answered by the one whose turn comes last, thus making a chain of thought. Whenever I see signs of flagging attention I use this as a resource, and so far it has been unailing.

We cannot in a consideration on the teaching of Mental Arithmetic neglect to notice those many devices given to us in all text-books on this subject for quick methods of working; perhaps the most familiar example of this is:—"To find the price of a dozen articles call the pence shillings and call every odd farthing threepence."

I see no objection to such rules provided each child is skilfully led to discover them afresh for himself, otherwise they are not useful as a mental exercise, but thus treated they certainly are a great save of time in practical life.

I have tried to show in a very simple manner, dealing only with the elementary rules, that Mental Arithmetic can be made to produce—*Fixed attention, Independent work, Promptness, Exactness*. It is very early learnt that "nearly right" won't do in this subject, and you will all agree that to train our children in accuracy is of importance for every department of life.

A RATIONAL LESSON.

BY S. DE BRATH.

THE end of instruction is not the imparting of knowledge! It seems well to preface an attempt to explain what it is by this paradoxical statement, because the contrary proposition is accountable for nearly all the mistakes of honest teachers. To "instruct" (*instruere*) is to build up—not knowledge—but the mind. It alone can be instructed. It is not a rag-bag for storing odds and ends, nor even a set of pigeon-holes where every item finds its fit place, but a living thing, and the characteristic of life is "function," action. To every intellectual problem which comes before us in daily life, we bring nothing but more or less acute perceptions, more or less alert reasoning, and more or less habit of resolution. Apart from duty and love, which are less matters of instruction than of education, the effectiveness of our action in face of life's daily tasks, will be in direct ratio of the degree to which these faculties have been developed. Putting aside for the present Willing, that motor power which uses circumstance as its raw material, let us consider for a few moments how the mind can be instructed—built up—so as to acquire quick perceptions and the habit of sound reasoning.

The notion that instruction is "storing the mind" with information, is at the root of the whole cramming system, unavoidable when true instruction has been neglected, and an examination looms near, but inexcusable as part of the normal course of education. Teachers endeavour, often with great pains, to give to their pupils the conclusions they have themselves arrived at, and the information they have themselves acquired, but it does not seem to strike them that the more correct and unassailable these conclusions are, the more passively receptive the mind of the learner is likely to become. To have the thinking done for them by the teacher, and to accept with careless assurance the results of that

thinking, is a state of affairs which the average pupil regards with much equanimity, but it does not fit him to grapple with difficulties himself, nor for thinking correctly on the available evidence. This desirable consummation can only be attained by the habit of constantly going through the process itself, and in order that the teacher may know how to put the mind through its paces, he must first understand the way in which a mind works. His instruction, that is, must be modelled on the laws of mind—it must be rational or psychological. I am a little afraid of using this last word, because some persons seem to think that it implies hypnotism, mesmerism, and ghost-seeing! I therefore prefer to speak of sound instruction as “rational,” conformable to the reasoning powers, although, no doubt, few readers of the *Parents' Review* would mistrust the former term.

Excluding the results of the spiritual perceptions, which are above those of the intellectual perceptions as wisdom is above knowledge, ideas are of two kinds:

- (1) General truths, which are abstractions formed by taking out of many particular cases, that which is common to them all.
- (2) Mind-pictures, by which we call up in our minds presentments of persons, events, and dramas of human life or of nature that we have never seen.

The first is necessarily described in language, the second would be best described pictorially. To the former belongs every idea which is summed up as a mathematical or grammatical rule, a law of Nature, a moral verity, a generalization from history, or such other “abstract truth.” The latter includes all which conceivably might have been seen, or might be seen, such as Henry V., the Battle of the Nile, the trial of Charles I., the Carboniferous Age, or the Solar System. Art unites the two; the picture, statue or poem embodying a truth and presenting a wide generalisation by means of particulars whose every detail is studied to subserve the main effect.

The stages by which the former kind of idea is reached are very easy to follow. First comes the direction of attention to the matter in hand; then that careful note of successive sense impressions which is called Observation; then the separation by the mind of what is distinct in these

different percepts from what is common to them all; and lastly, the expression of this in correct language. These four stages have been called Attention, Observation, Generalization, and Formulation. Correct reasoning involves going through this process, and if the premises are complete, the observation accurate, and the inferences logical, the result is a truth. The concept is now complete. The lesson should move this process as a key moves a lock. Sound teaching, which habituates the mind to move logically, must be adapted to it, and the corresponding stages of each lesson are: Preparation, recalling the old, and directing the attention towards the new; Presentation of the new matter, to all the senses as far as possible; Association of the particulars and that which is essential in each; and Formulation, the expressing of the result attained in good plain English.*

As an instance let us take a lesson to a child of about thirteen beginning chemistry, on the distinction between mixtures and compounds. The definite concept to be reached is that in a mixture the components still exist as such, but in a compound a new kind of substance is formed out of them. The first stage of the lesson will recall instances of mixtures, and elicit what the children already know, for this is always the point of departure. A class will instance mixed marbles, mixed sweets, coloured sands, earth and water, milk and tea, oil and paint, etc. etc. The idea of a mixture already exists. Second stage: Bring before them some flour of sulphur and iron filings. The greenish mixture is separable (by sifting or with a magnet) into yellow sulphur and bluish iron; bring out that each is separately existent in the mixture. Heat some in a ladle; the greenish powder has become a black solid, having quite new physical properties. Now wherein does the difference consist? Children will probably think that it lies in the separability, but a question or two on how to separate oil and paint, or milk and tea, will disprove this. Present other compounds, sulphate of copper, black oxide of iron, litharge, etc., and point out that each is a new kind of thing, having new properties different from the united properties of the components. Third stage: The separate percepts

* The analysis by Professor Rein and other psychologists differs slightly from this, but the essential meaning of all is the same.

are now complete. Skilful questioning (and here again the skilful teacher is seen distinct from the lesson-hearer) will bring out the essential point, that among many characteristics the one common to all is the formation of a new substance. This will come bit by bit from the children. Fourth stage: The conclusion reached will be expressed in correct language *by the class*, aided, of course, by the teacher, and written down—"a mixture is formed when two or more bodies are blended without either being changed; a compound is formed when they change each other into a new kind of substance." They have now reached, by their own exertion, a general truth which is long remembered.

Ideas of the second class, dealing with unseen persons or facts, are reached by a somewhat similar process, the synthesis of particular notions to form a general notion. The steps of the mind are here: Attention, the recall of similar or associated concepts; Imagination of the fresh notions brought up by the teacher; the combination of these with the preceding ones; and finally, the Visualization of the combined concepts. The corresponding teaching steps are again: Preparation, the revival of the old knowledge to establish an associative interest; Presentation, which gives the material for the new idea; Association of the new with the old, and with collateral images; with a final Visualization of the whole imaginative picture called up.

This process has the very distinct difference from the last that the end reached is not a product of the reasoning, but of the imaginative faculty. The lesson which is to culminate in the visualization of a person, a character, a dramatic scene, or a natural phenomenon must, therefore, be differently treated to that which ends in a concept properly so called, even though the process be sufficiently like the former to be fitly called by the same names. Finally in either case comes the transition without which no instruction is complete, or is permanently understood, the passing from Saying to Doing the practical application of the thing learned, and this is a point which is almost totally neglected in the ordinary schools of to-day.

All this is an application of natural psychological law. It is not a patent "system" or ingenious device to save trouble to the learner, every "live" teacher conforms to it more or

less. But like most truths it needs an apprenticeship for the application of it, and it is certain that considerable thought and practice are required in order to give effective instruction on this plan. For not only has the place of each lesson to be carefully thought out and allotted so as to form useful material for use in its turn, but each involves considerable reflection what, out of the vast mass of available material, shall be chosen to lead the class by direct and unfaltering steps to the essential point. That this is not the method of the ordinary lesson it is needless to point out. The usual course is simply to set the new fact or rule before the child in printed language to be learned and remembered, and I have noted how very often the effort to remember the words completely checks the process of forming the idea, not to speak of the fact that his interest is not aroused, that he endeavours to keep the formula in his mind till examination time, and soon finds out that if he subsequently forgets all about it nobody seems to care. He is not called upon to use it as a basis for further acquirement, and to him it seems detached from all living interests, and set him for some wholly inscrutable reason.

We are now in a position to look more closely into the first stage of the rational lesson—Preparation.

The intention of this stage is that with which Froebel begins in the kindergarten—to arouse that self-activity without which the mind sits passive before its task. It is not by carrying the method of the kindergarten into the school, however, that the problem of rational instruction is to be solved, but its principles, and the first of these is the awakening of this self-activity. The stage of preparation therefore can very rarely be a lecture. Oral teaching is sometimes caricatured as that in which the masters learn the lessons and the boys hear them. The remark is just if applied to the lecture, which does not stimulate the self-activity of the schoolboy, whatever it may do for the undergraduate. Possibly even he might benefit by a little questioning on the Peripatetic method used by the Greeks we so admire, before printed books were the ordinary means of instruction. Nor can it be "preparation" in the ordinary sense, where a boy "gets up" so much Homer or Euclid as best he may, and is subsequently "heard"; but it is any

process whereby the attention is aroused and the mind set thinking in the required direction. This may be done in several ways, and some of these are better suited to ideas of the first kind than to those of the second. To bring home a truth we may proceed (1) by questions judiciously put to bring out what the class already knows on the subject. These questions will test the ability of the teacher: he must remember that to call up collateral notions not directly connected with the matter in hand, is to waste time and cultivate a habit of discursiveness; to omit necessary ones is to foster the habit of incorrect reasoning; to ignore previous lessons is to break the continuity of instruction; to ask a string of leading questions is to repress mental activity, not to encourage it; (2) another way is to begin with an experiment already familiar or fairly obvious, often that of the last lesson will serve, but if this method is used it must be very short, very simple, and directly bearing on the principle; or (3) the preparation may be a statement, a question, or some problem which the class can do without difficulty.

The preparation for a lesson of the second kind—the clear imaginative realization of a fact may proceed by any of the above means, but perhaps even preferably by (4) a picture which will call up familiar and kindred ideas; or by repetition (5) of the substance of some previous and closely connected lesson either in the same, or (6) in an allied branch.

Whatever method be adopted, however, effective preparation will have the following essential points:—it will arouse and direct the attention, it will make clear to the teacher the real ideas already existent in the minds of the class, it will cast out the irrelevant matter and will link on the new to the old. A few examples will perhaps be of interest—

(1) GEOGRAPHY.—Children aged seven; lesson of thirty minutes. "There are many kinds of earths, soil, mud, clay, sand, gravel, stone, chalk, slate, marble, and others." Preparation by question. What has been noticed out of doors? What do the garden plants grow in? What the ground near is like? The road? The stream-bed? What are the roads mended with, and why? What are houses roofed with, and why? All leading up to definition of the physical properties of each, "preparation" lasting about fifteen minutes.

(2) PHYSICS.—Children aged eight. One of a series of lessons on water. Thirty minutes. "The difference between water that has stuff *mixed*

with it and water that has stuff *dissolved* in it is that in one case the stuff can be filtered out, and in the other it cannot." Preparation by experiment. Take a little water in a glass and put in a pinch of clean sand. Elicit that this is not "mixed." Put in a pinch of powdered chalk. Elicit this is "mixed." Same with powdered white sugar. Elicit this is "dissolved." "Preparation" lasts five minutes.

(3) GEOMETRY.—Child aged ten; lesson on "the construction of an isosceles triangle on given base, one side being known." Forty-five minutes. Preparation by statement of a previous lesson. "All straight lines drawn from the centre to the circumference of a circle are equal." Class to restate all radii of the same circle as equal. Thence deduce that every arc struck with the same radius measures lines of equal length, which is the principle to be applied to the construction. Ten minutes.

(4) HISTORY.—Child aged nine. Episodes of the Roman conquest of Britain. Thirty minutes. Preparation by picture. Show the "Landing of the X. Legion," already familiar, and thence recall the whole enterprise up to the starting-point of the lesson. Five minutes.

(5) LANGUAGE.—Child aged nine. Series on sweeping the room—Gouin method. Forty-five minutes. Preparation by repetition. Repeat the preceding series. Ten minutes.

(6) LITERATURE.—Child aged twelve. Chevy-chase. Forty-five minutes. Preparation by recall of former connected lessons. Recall geography lessons on the Border, and castles and arms of the XIV. Century. Fifteen minutes.

Enough has now been said to make it clear that each "rational" lesson must be adapted to the age of the child, must have its proper place in the general order of instruction, must be linked to those which went before it, and must be given in the natural sequence according to which the mind works, and that the first stage of this sequence is to arouse and direct interest. The next stages carry the child through the reasoning or the imaginative process, and the custom of doing this is instruction—the building up—of the mind, for 'use doth breed the habit in the man.' I know by experience that lessons thus given, and depending one on another, are not forgotten at the end of the term, nor even at the end of the year, but pass into the permanent possessions of the mind, which thus gains knowledge of its own manufacture as a by-product of the educational process, which on its intellectual side is the habit of sound reasoning on the materials placed before it.